

# **Builders of the ARPANET 1969 - 1971**

## ABOUT YOUR NETWORKING SCROLL FROM ACC SYSTEMS

We hope you will enjoy this scroll which contains a number of references to modern networking and protocols. We can say "modern" because connectivity or interconnectivity as achieved today was not always so easy. In the '50s and '60s connections were primarily to a single machine and mostly point-to-point. Moreover, every time two different types of machines required connection a special interface had to be designed.

Designers strove to make the interfaces modular so that each successive unit was easier to implement; but all computer systems were different, designed for different purposes, with variable numbers of bits per word or character.

Packet networking and the concept of a common language for communications to allow dissimilar systems to communicate, produced a fundamental change. A group of computers available 24 hours a day to move information reliably from source to destination, with redundant connection paths, was a revolutionary idea.

In the late '60s the Advanced Research Projects Agency (ARPA) provided funding for the development of such a network; and, Bolt Beranek and Newman (BBN) won the contract to implement that first packet network, the ARPANET.

The finger tips at the left of the scroll depict the ARPANET sites connected in late 1969. Those sites were precursors of others to come, with the new network destined to link the varied resources resulting from more than 20 years of research in basic computer science. The contracts and grants that allowed such research came from decades of government funding. Funds came from ARPA, the National Science Foundation, the Office of Naval Research, Rome Air Development Center, National Institutes of Health, and other departments and agencies of the government.

With those funds, computer science in the USA took great strides; producing much of what is taken for granted today. The first four sites on the ARPANET embodied the work of inventive and creative people, like Glen Culler (UCSB) using interactive graphics to solve mathematical problems, Dave Evans and Ivan Sutherland (UTAH) with graphics and image processing, and Doug Engelbart (SRI), who invented the means for computers to augment human ability in the creation and manipulation of textual material (Doug invented the mouse, a copy of the first one is shown in the drawing).

The other ARPANET site, UCLA, was involved in network measurement and modelling under the direction of Leonard Kleinrock. UCLA was also home to the Network Working Group, chaired by Stephen Crocker who led the development of the first host-host protocols.

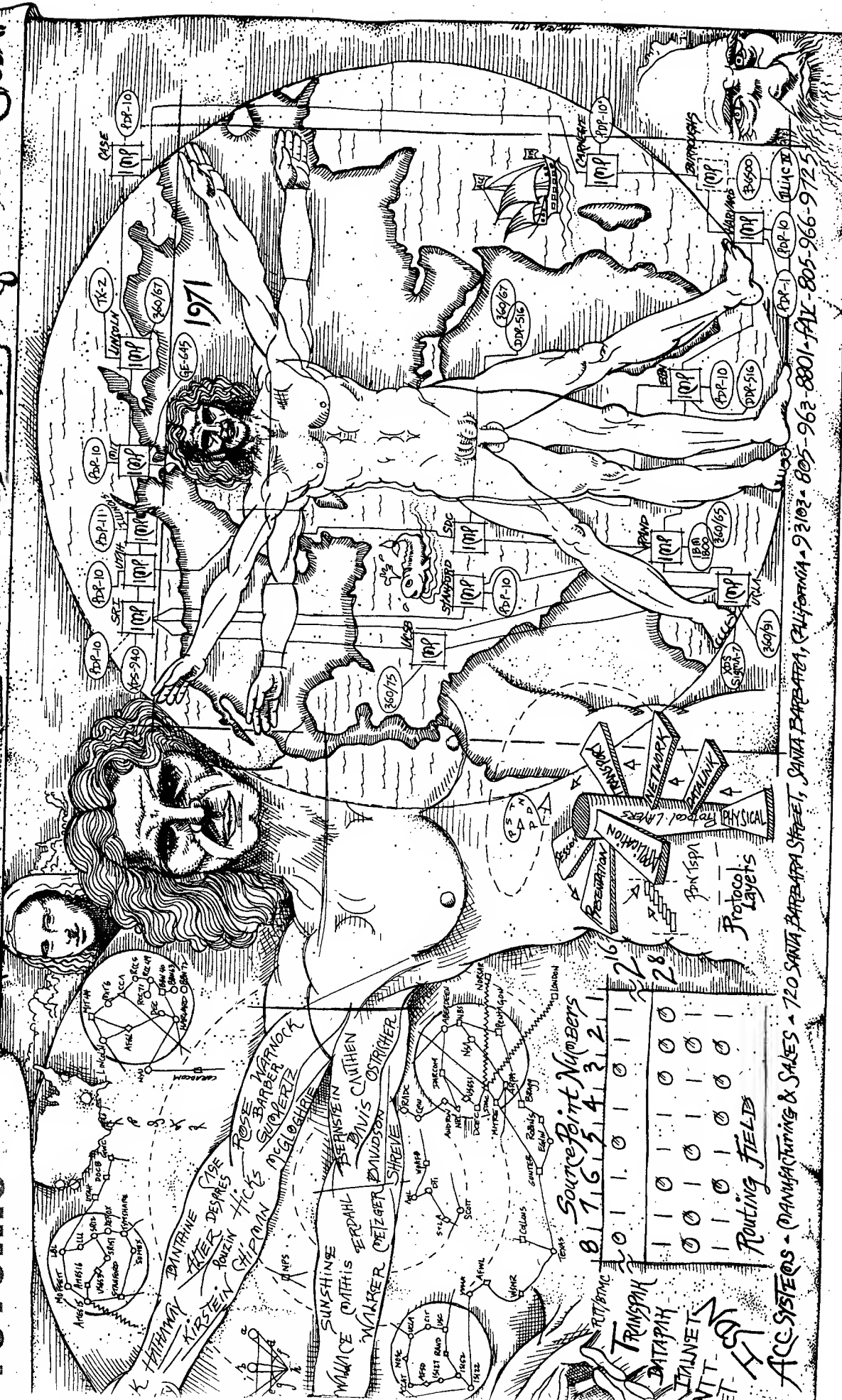
If you look carefully behind the Vitruvian Figure you will find a map of the ARPANET as it was during 1971. The rest of the illustration attempts to give credit to many of the networking pioneers during those early years. Those from ARPA included Bob Taylor, J.C.R. Licklider, Larry Roberts, and Barry Wessler; those from BBN included Frank Heart and Bob Kahn among others as shown.

We have tried to memorialize as many of the others involved with that rapid implementation of new ideas and techniques as we could remember; but there are, no doubt, some apologies due to those who were missed.



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